Data Requirements to Support Road Pricing Analyses

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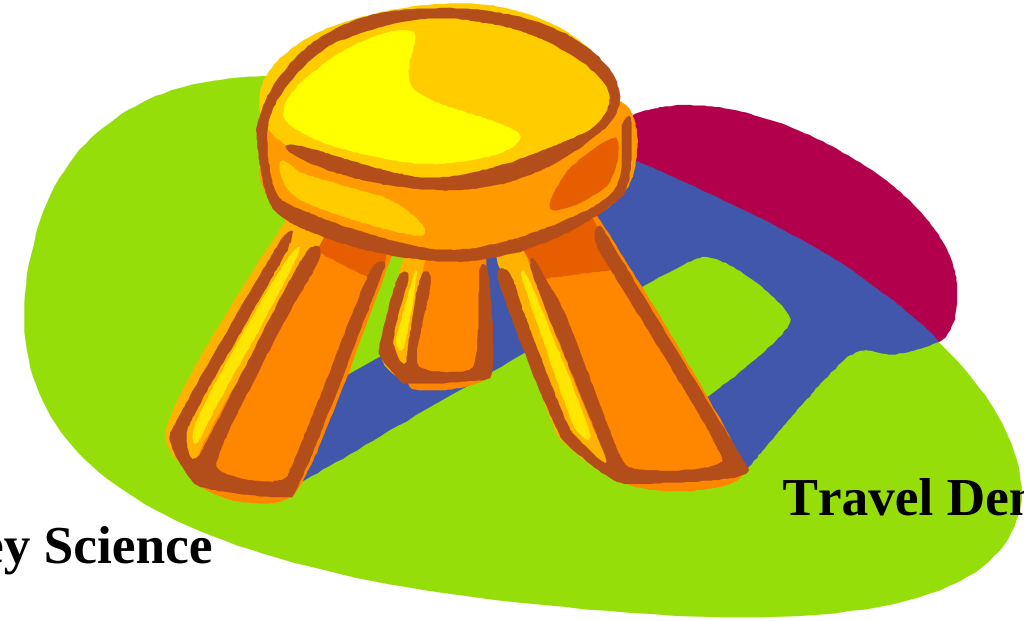
Road Pricing & Travel Demand Modeling

Introduction



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Historical Context

- 1790s, Lancaster Turnpike, PA
- Mid-19th century, tolling peaked
- 20th century, roads operated by state highway depts
- 1920s, federal legislation banned tolling on roads that received federal funding
- 1950s, federal interstate highway program
- 1990s, congestion management
- Late 1990s, transportation infrastructure funding shortage
- "Innovative financing" tools and programs

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Road Pricing: Two Purposes

- **Congestion Management**
  - ➔ Shift travel to other routes, modes and times desirable
  - ➔ Reduce peak-period vehicle traffic
  - ➔ Keep free-flow conditions in priced lane/ road
- **Fund Infrastructure**
  - ➔ Generate funds
  - ➔ Set rates to maximize revenues or recover specific costs
  - ➔ Shift to other routes and modes not desired (because this reduces revenues)

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Current Road Pricing Strategies

Type	Description	Policy Objective
Road Tolls	Fixed fee for driving a road	Fund infrastructure, generate revenue
Distance-based Fees	Fee for vehicle use	Fund infrastructure, generate revenue
HOT Lanes (Managed)	Drivers pay fee to use HOV lane	Optimize road capacity, generate revenue
Cordon (Area) Tolls	Fees charged to enter a particular area	Reduce congestion in urban centers
Congestion Pricing	Direct time of travel charges for road use	Discourage trip making, shift travel routes, times, modes

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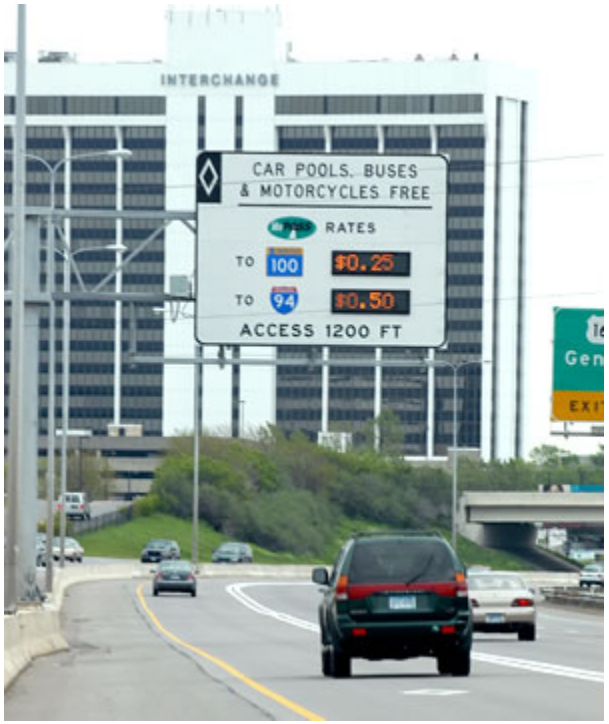
Road Pricing Analyses

- **Increased pressure for:**
  - ➔ Political acceptance
  - ➔ Social equity
  - ➔ Financially success.
- **Dependent on:**
  - ➔ Numerous operational factors,
  - ➔ Contextual considerations,
  - ➔ External variables.



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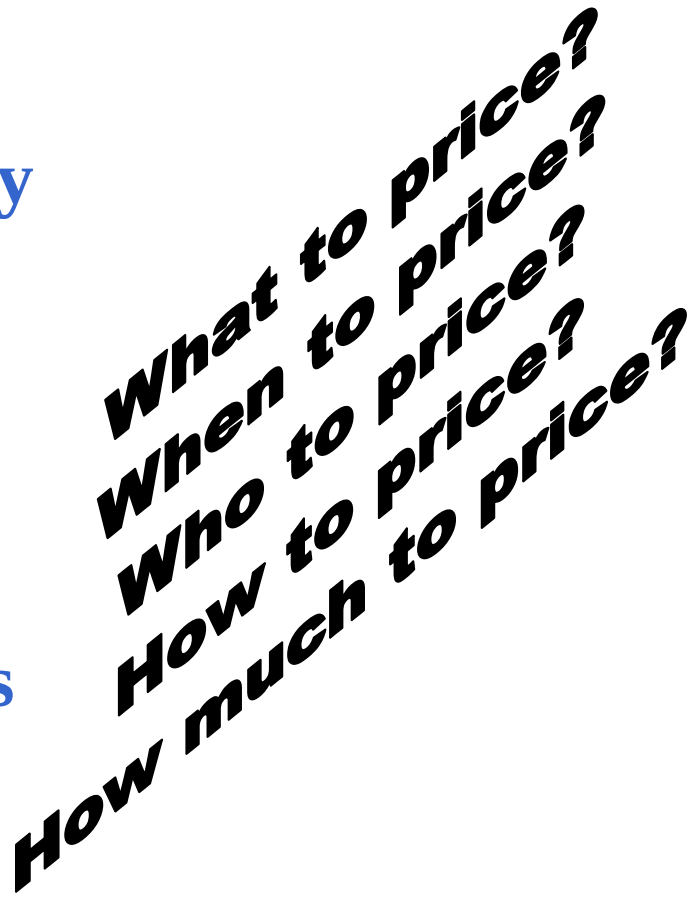
Audiences for Road Pricing Analyses

- Financial community
- Private consortia
- Federal agencies
- State agencies
- Toll road authorities



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Need Accurate, Reliable data

- **Increasing scrutiny of reliability of traffic and revenue forecasts as well as accuracy of evaluations of project performance**
- **Situation improved with standards or guidance for project performance measures and "total program" forecasts and assessment**
- **Need for:**
  - ➔ More data, more information
  - ➔ Enhanced peer review of forecasts
  - ➔ Increased competition within the community of demand forecasters

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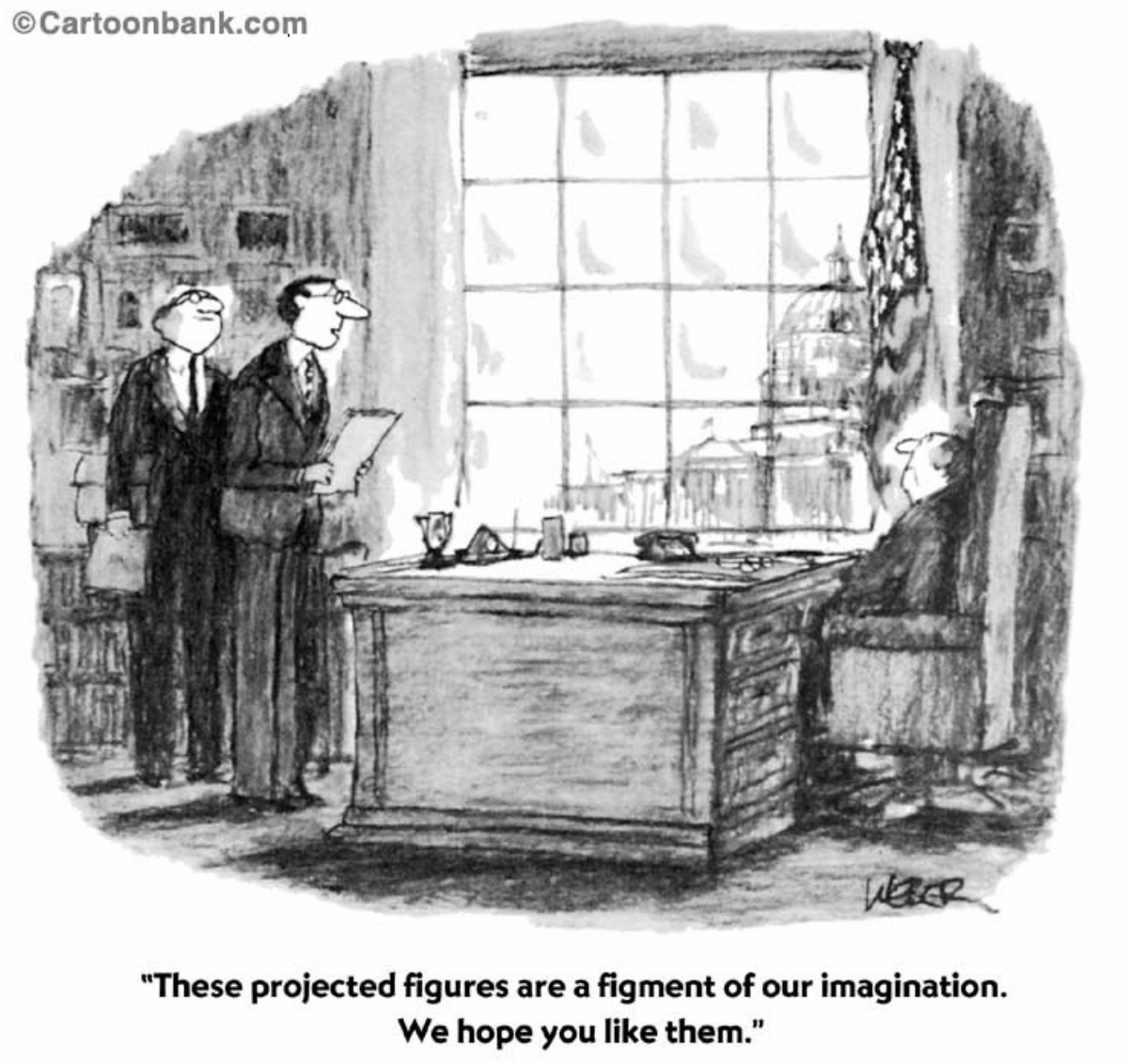
Empirical Investigation of Data Quality Issues



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Issues associated with Data Quality

- Before and after studies
- Incomplete or dated information
- Manipulation of estimates
- Better estimation of VOT
- Reliance on borrowed data
- Lack of sufficient rigor in data collection (particularly in statistical sampling)

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Data Requirements for Pricing Analyses

- **Policy Level**
  - ➔ Data to measure potential effects
  - ➔ Macro-level analyses
  - ➔ Longest time horizon
- **Strategic Level**
  - ➔ Data for implementation
  - ➔ Shortest time horizon
- **Tactical Level**
  - ➔ Data for funding
  - ➔ Micro-level analyses
  - ➔ Both short- and long-time horizons

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Policy Level: Data Requirements

- **Demand side variables**
  - Public sentiment
  - Traveler characteristics
  - Traveler's travel activity levels
  - Traffic flows
- **Supply side variables**
  - Road network information
  - Congestion effects

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Strategic Level: Data Requirements

- Traffic data
- Revealed preference data
- Stated preference data (VOT, mode choice)
- Socioeconomic variables
- Demographic variables
- Attitudes and values
- Project revenues and expenditures
- Roadway performance

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Strategic Level: Panel Data

- Mode split
- RP data
- Road user / non-user characteristics
- Attitudes
- Perceptions of roadway performance

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Tactical Level

- Land use, demographic assumptions of population and employment
- Alternative or competing routes or feeding projects
- Weekday versus weekend traffic
- Review of travel demand parameter assumptions
- Trip making characteristics (i.e., revealed preference)
- Value of time (probability of potential drivers paying to use the facility)
- Market segments
- Trip purpose
- Vehicle class
- Time of day
- Toll rates
- Economic and political risks

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Conclusions

- **Data framework (consistency in data) regardless of analysis type**
- **Criteria for designing framework**
  - Relevance
  - Appropriateness
  - Reliability
  - Affordability

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Recommendations

- Explicit standards for pricing analyses
- Empirical meta-analysis of forecasting accuracy
- Greater prominence and importance given to peer reviews.
- Standard, valid, reliable data and methods of analysis needed to create informed pricing options

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